

BRIEFING MATERIALS

Enforcement Division-Legal Branch

OFFICE	TE	BIG RIVER MINE
ID#	MOD	9811210899
BREAK		107
OTHER		AK
CP		26-81

Discharge

St Joe Minerals
Big River Lead Mine Tailings
10 00 a m , February 6, 1981

Subject Is the Lead Mine Tailings a Superfund Candidate?

- I Map
- II Memorandum on Issues
- III Lead Contamination in Fish in Big River (Mo Dept of Conservation)
- IV Lead in the Fish From the Big River (Mo Dept of Health)
- V Superfund Issue
- VI U S Dept of Interior Request for Superfund Action

Divisions Involved

ENFC - Bill Ward, Don Toensing
Water - Norma Sandberg, Alice Cooper, Ken Bland
ARHM - Katie Biggs, Kerry Herndon, Martha McKee
SVAN - Leo Mosby, Norma Sandberg, Phil Geary
R&D - C Hajinian

EPA Involvement

Ada, Oklahoma - Don Draper
MERL -
Headquarters Hazardous Waste Task Force

Other Agencies

MDNR - Steve Hency, Bob Hentges, Dick Rankin
Mo Dept Conser - Whitley
Mo Dept of Health - Denny Donald
U S Bureau of Mines - Larry George
U S Fish & Wildlife - Chris Schmidt
Corp of Engineers - Robert Muffler
Department of Justice - Toby Kennedy

*Discharge meeting - for
George*

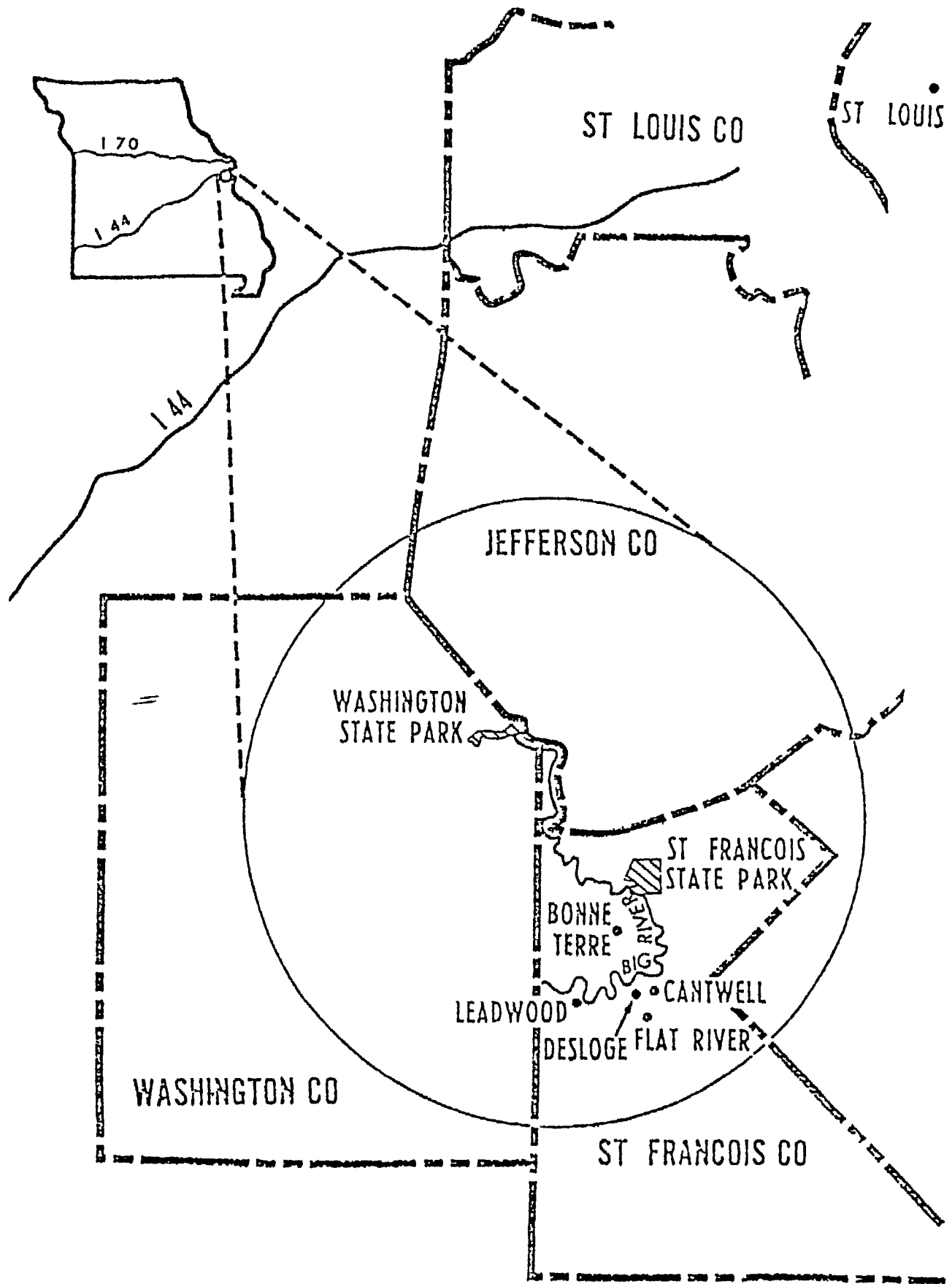
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SUPERFUND RECORDS

Figure 1
STUDY AREA LOCATION MAP



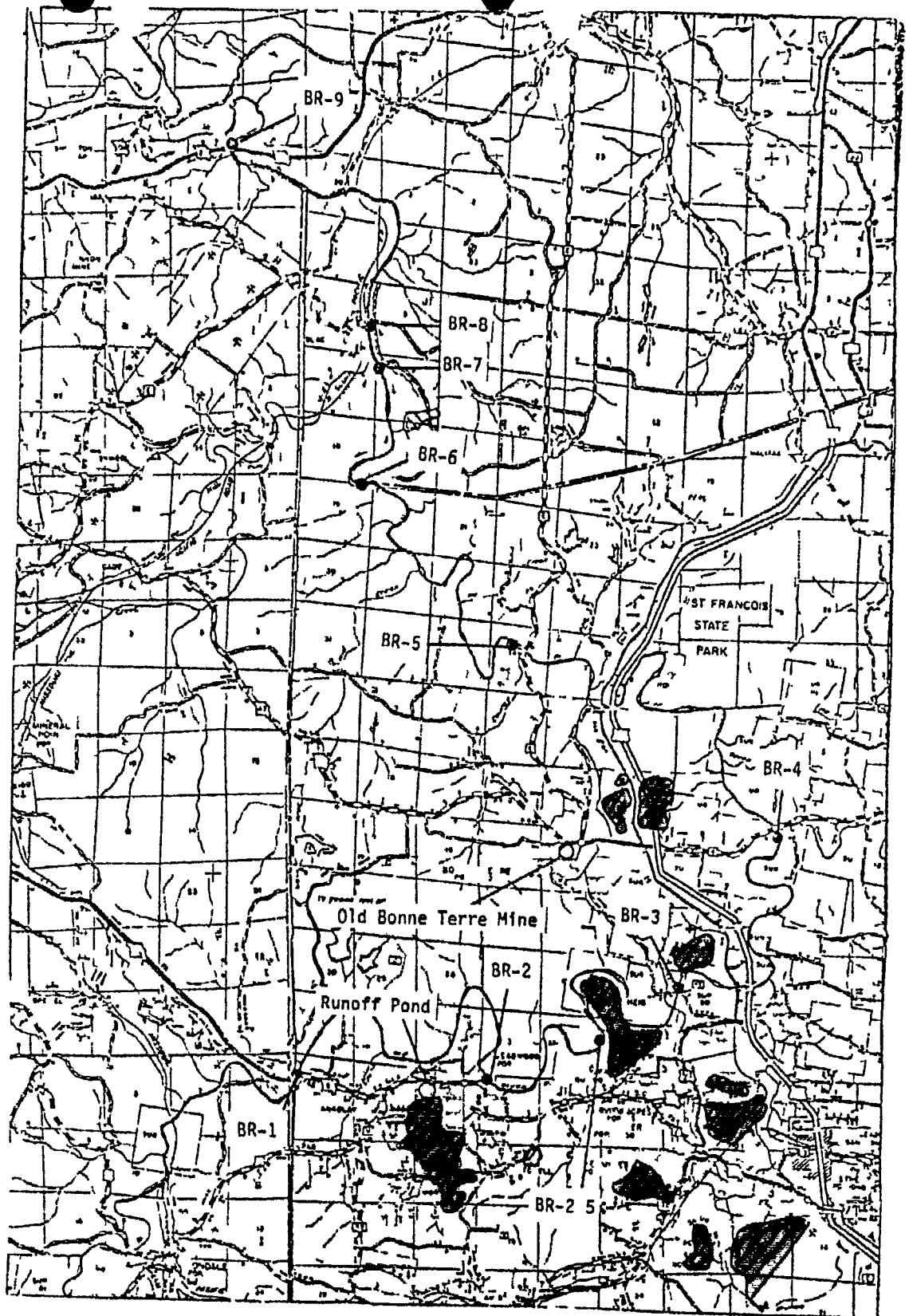



FIGURE 2
Big River Stream Station Location Map

Legend

- BR-1 Stream Station
-  Mine Tailings

Big River - Lead Mine Tailings
St Joe Minerals Issues Summary

2/4/81

William H Ward, Attorney
Legal Branch

Louise D Jacobs
Director, Enforcement Division

THRU Terry S Watt, Chief
Legal Branch

A large quantity of lead tailings, created by St Joe Minerals Corp and donated to St Francis County in 1972, presents three problems--two actual and one potential. They are (1) the tailings which have already entered the river, (2) continued erosion from the pile into the river, and (3) interaction with leachate from a sanitary landfill now operating in the pile.

The first two are actual problems, as evidenced by elevated levels of lead in the flesh of fish downstream of the pile, prompting the Missouri Department of Health to issue warnings to the public against eating bottom feeders. Removal of the tailings already in the river may be, from a practical standpoint, impossible. However, wind blowing across the unvegetated pile causes some of the lighter tailings to collect in the

ravines where rain washes them into the river. This further exacerbation of the problem could be eliminated by repairing the ravines and stabilizing the pile with vegetation. We understand that negotiations are under way between high level representatives of MDNR and St. Joe to fund pile stabilization, but not river cleanup. An effort should be made at the appropriate EPA level to ascertain the status of those negotiations.

The third is a potential problem, and arises from the possibility--expressed forcefully in a report of a consultant to MDNR--that organic chelating agents from the sanitary landfill in operation in the pile could leach the lead and zinc from the tailings and carry them to the Big River. The potential exists, says the University of Missouri at Columbia's Dr. John Novak, "for creating an ecological desert out of Big River." In addition, says Novak, "since the Big River is a major tributary to the Meramec River which is a water supply for parts of St. Louis, the heavy metal mobilization may be of concern." Dr. Novak has approached EPA's Ada, Oklahoma, research laboratory money to perform what appears to be a simple test to verify the potential of heavy metal mobilization. The grant was not made, due to funding priorities.

MDNR's Solid Waste Division, which approved the landfill site originally, disputes Novak's hypothesis. They point to low levels of heavy metals in samples of what they believe to be leachate from the landfill to support their position. However, it is not clear to me that the liquid the state sampled was actually landfill leachate, and Dr. Novak's view of the

chemistry involved is supported by certain Region VII staff people

Accordingly, I believe the most prudent step is to perform the test which Dr Novak proposes

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RECOMMENDATIONS

1 That an effort be made, at the level of the Regional Administrator if necessary, to determine the present status of the State's negotiations with St Joe Minerals, since a settlement by the State will be of important practical significance to the success of any litigation

2 That an immediate effort be made to resolve the questions involving the chemistry of the leachate/tailings interaction. If these questions are resolved in favor of the Novak position, EPA should consider seeking to have monitoring wells established in the landfill area to verify and trace the mobilization of lead under the authority of CWA §308

Ultimately, it may be necessary to seek injunctive relief against the existence of the landfill, under the authority of RCRA §7003 and CWA §311 and §504 but information developed by the research and monitoring program may compel the state to take action obviating EPA's involvement

LEAD MINE TAILINGS - BIG RIVER

Background

St Joe Minerals Corporation deposited lead mine tailings near Desloge, Missouri for approximately thirty years (1929-1958). The tailings pile covers approximately 500 acres at a depth of 0 to 100 feet inside a horseshoe bend of the Big River. The tailings are reportedly 2-4% lead.

In 1972, the site was donated by St Joe Minerals to St Francis County, who in turn donated it to the St Francis County Environmental Corporation (not for profit corporation). In 1973, the corporation established an approved sanitary landfill within a portion of the tailings of pile.

In 1977, an immense quantity of tailings (possibly 50,000 cubic yards) washed into the Big River apparently in a single event. Smaller erosion areas have continued to deposit tailings in the river since that time. The Missouri Department of Conservation estimates that over 20 miles of the Big River have been affected by the tailings. For several miles downstream of the tailings pile the primary constituent of the stream bottom is mine tailings.

EPA Involvement

At the request of MDNR, SVAN conducted an intensive survey of the Big River in late 1977. Their general findings were that the Big River was degraded (based on aquatic population density and diversity) by the mine tailings but mainly as a result of the physical changes in the stream bottom rather than chemical toxicity.

In March, 1978, the EPA, as well as other state and Federal agencies, received a letter from MDNR requesting assistance of any kind in correcting the problem. In April, EPA replied that the problem could fall under either 301 (point source discharge) or 311 (discharge of a hazardous substance) of the FWPCA. At the time the 311 regulations were not final and the applicability of 311 was not known. EPA offered assistance (other than monetary) in pursuing either of these two approaches.

Present Status

The Corps of Engineers referred this case to the Department of Justice about 1 1/2 years ago under the Refuse Act. The details of the proposed lawsuit are unknown. It is still awaiting some action by the DOJ according to a Corps of Engineers attorney.

The Department of Conservation has recently produced evidence of elevated lead levels in fish downstream of the tailings pile. There are also some reports of elevated lead levels in the blood of people living in the Desloge area. Also, the Corps of Engineers has found elevated cadmium levels in fish taken from the Big River approximately 25 miles downstream of Desloge.

A consultant hired by MDNR recently concluded that unless remedial work was done to stabilize the pile, another catastrophic washout of mine tailings could occur

The Missouri/EPA agreement for FY-81 commits MDNR to "evaluate past studies on the Big River and recommend an implementable solution" EPA is committed to "identify and assist in securing funds from available sources to implement solutions recommended for the tailings pile problem on the Big River"

Alternatives

1 The drainage structures installed by St Joe Minerals are probably "point sources" under the Clean Water Act These structures collect and discharge stormwater falling on the pile The discharges to the Big River would almost inevitably contain pollutants in the form of mine tailings

The major drawback to this approach is that the vast majority of the tailings do not reach the river via the "point sources", but rather through non-point source discharges

2 The discharge of tailings to the river might be classified as discharges of hazardous substances under 311

The lead ore mined in this area is primarily galena which is Lead Sulfide Lead Sulfide is a hazardous substance under the 311 regulations and has no doubt been discharged to the river in reportable quantities (i.e. 5000 lbs)

3 Information on this problem was submitted to ARHM in March, 1980 as a possible uncontrolled hazardous waste site In July, 1980 ARHM declined to list it as an uncontrolled site because "the State seems to have this situation under control" On September 15, 1980, this site was resubmitted to ARHM along with preliminary assessment form We have received no response as yet from ARHM

A review of the RCRA regulations indicates that the lead mine tailings are a hazardous waste

The state hazardous waste regulations, however, specifically exclude those mine tailings from the definition of hazardous waste

Recommendations

1 A possible 311(e) action in the U S District Court for the Eastern District of Missouri could be initiated to abate the threat of another catastrophe like the one which occurred in 1977

2 A RCRA §7003 case is also possible as there is fairly persuasive evidence of environmental damage to aquatic life

The potential parties to either of these actions would be St Joe Minerals Corporation, St Francis County, and the St Francis County Environmental Corporation

Related Information

1 There is apparently no documentation of any significant discharges of mine tailings to the river during the period of time that the site was owned and maintained by St Joe Minerals Corporation

2 There are numerous other large deposits of mine tailings in this area, however, this particular site is the only one known to present a significant hazard to surface waters

3 The consultant hired by MDNR feels that the operation of a sanitary landfill in the tailings pile is not advisable This is based on his findings that large amounts of lead are "mobilized" by organic acids of the type that would be contained in leachate from a sanitary landfill

State solid waste personnel do not evidently agree with this finding

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Carry?

① Please set up brief meeting for answer to questions
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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SUBJECT Big River-Lead Mine Tailings-St Joe Minerals Enforcement Recommendation

FROM Terry Satterlee Watt
Chief, ENFC-LEGL

Answer
Warrant, 1
Let's see we should
go ahead with

TO Louise D. Jacobs
Director, ENFC

litigant
process,

1 The background and present status of this matter are presented in the attached memorandum prepared by Don Toensing, CPML, previously submitted (Attachment A)

2 Recent studies by the Missouri Department of Conservation have found elevated levels of lead in the flesh of fish in the Big River downstream of the tailings pile. Levels were much higher in sucker fish, which are bottom feeders, suggesting that the fish may ingest the tailings as they feed (Attachment B). At least one other hypothesis has been suggested, and the lead uptake mechanism is not definitely known

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3 The Missouri Department of Health has issued a warning to the public not to eat suckers from the Big River, a popular activity in the fall (Attachment C). The Department is presently conducting studies to determine the blood lead levels of people in the vicinity of Big River. These studies will help determine the actual danger posed by various levels of fish consumption.

Thank,
you

4 Professor John Novak, University of Missouri at Columbia, in a study of the problem for the Missouri Department of Natural Resources states

if

Erosion continues at this site and although the current level of discharge is small, the potential exists for significant quantities of additional material to move into the Big River."

Novak recommends a \$200,000 program for stabilizing the tailings pile. Robert Hentges, MDNR's Water Pollution Control Program Permit Section Chief, has been closely involved with the problem from the start and believes a much larger expenditure may be required to permanently stabilize the pile. MDNR is presently involved in negotiations with St. Joe Minerals involving the cleanup. St. Joe is reported to have offered to fund the Novak approach. At the request of MDNR staff, the Missouri Clean Water Commission on October 29, 1980 postponed action on the matter until its next meeting to permit the negotiations to proceed.

5 Hentges, while believing that the stabilization of the pile is of great importance, is convinced that natural forces will cope more successfully with the tailings already in the river than any dredging.

program could His view is shared by the Missouri Department of Conservation which notes the complete destruction of the ecology of the stream which a dredging program would entail

6 The Corps of Engineers, seeking to protect the water quality of a proposed reservoir downstream, requested legal action from the Department of Justice two years ago, pursuant to the Rivers and Harbor Act, 33 U S C 407 No action was filed, and Toby Kennedy at the Department of Justice is trying to find out what happened Studies for the Corps of Engineers being performed by the U S Fish and Wildlife Service suggests that levels of lead in the reservoir waters would be too high to permit the reservoir to be used as a water supply, and the Corps of Engineers is expected to be less interested in this problem now for that reason Nonetheless, they may be willing to join with us in any legal action

See Ed Vos.
8/4/80 memo
to Jule, in
7/10/80
R+D
Section

7 Regulations issued the last of October reportedly exempt certain mining wastes from the requirements of RCRA The regulations will be reviewed as soon as they are received

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Big River - Lead Mine Tailings - St Joe Minerals Update to November 17, 1980, Enforcement Recommendation

Terry Satterlee Watt
Chief, ENFC-LEGL

Louise D Jacobs
Director, ENFC

1 Paragraph 7 Recent Congressional amendments to the Resource Conservation and Recovery Act (RCRA) provide that the following materials shall be "subject only to regulation under other applicable provisions of federal or State law in lieu of this subtitle [Subtitle C]"

"(ii) Solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rock and overburden from the mining of uranium ore "

While apparently applicable to lead mine tailings, this amendment does not affect the authority of the Administrator under §7003, which is in Subtitle G of RCRA. The tailings remain a "hazardous waste" (see 40 CFR §261.31, 45 FR 33123) the regulation of which under Subtitle C has simply been "suspended" (See Superfund Act, Section 101(14)(c)). In any event, the tailings are certainly "Solid Wastes," for the purposes of RCRA §7003. The amendment does, however, appear to make unavailable the authority to order the drilling of monitoring wells, as authorized by new §3013(b), but a member of the Hazardous Waste Task Force is researching this issue.

2 Paragraph 4 Dr. Novak's report also discusses the sanitary landfill operated in a portion of the tailings pile by the non-profit St. Francis County Environmental Corporation. After noting the scenic damage done by entry into the river of material placed by the Corporation in an effort to stop some of the erosion, the report states:

"A more serious problem exists with regard to the sanitary landfill. The liquid runoff (leachate) which results from landfilling usually has low pH and contains large quantities of organic material. Under these conditions, heavy metals may be leached from the tailings and carried into Big River."

Dr. Novak then summarizes the results of laboratory tests which show the strong ability of a leachate analog, EDTA, to extract the lead. He cites certain minor benefits from the landfill operation, but concludes "the potential for creating an ecological desert out of Big River due to lead contamination is enough to offset these potential benefits." Dr. Novak concludes:

CONCURRENCES

LEGL	LEGL	LEGL					
Watt	Dr. Novak	Watt					
1/15/81	1/15/81	1/15/81					

"It is therefore recommended that DNR immediately undertake a monitoring program at the landfill site to locate any sources of leachate and to characterize the quality of this material. It is further recommended that studies be undertaken to determine the leaching potential and movement of metals resulting from contact between leachate and tailings."

Dr. Novak approached EPA's Ada, Oklahoma, research facility with a preproposal directed at the latter question, but - although a site visit to the pile was made by an Ada representative - no funding was forthcoming.

Dr. Novak's concern about the potential threat of the expanding landfill operation is not shared by the MDNR's Solid Waste Management Program, which approved the operation initially. They have reportedly taken the position that chemical interaction between any lead-bearing leachate and the surrounding tailings would cause the lead to precipitate and stay in the pile. This view is strongly contested by Dr. Novak and others, but deserves, it would seem, immediate experimental study. MDNR's solid waste Division points to the analysis of water samples taken in a concrete tunnel at the edge of the landfill - and presumed to constitute leachate from the landfill - to support their position. Those samples failed to show "gross mobilization" of lead, but a strong question exists as to the conclusiveness of these tests. (Attachment A)

If the Novak position is verified in laboratory tests, monitoring wells should probably be drilled in the landfill area to confirm and trace the mobilization of the lead. While RCRA §3013(b) is probably unavailable to allow us to require the drilling of monitoring wells, CWA §308(a) states:

"Whenever required to carry out the objective of this Act, including but not limited to (4) carrying out Sections . 311 and 504 of this Act -

- (A) the Administrator shall require the owner or operator of any point source to (i) install, use and maintain, such monitoring equipment or methods as he may reasonably require."

Only the "owner or operator of a point source," however, may be required to respond to a §308 directive. A "point source" is a "discernible, confined and discrete conveyance from which pollutants are or may be discharged." CWA §502(14). Arguably, the landfill, itself, is not a sufficiently discrete conveyance as to constitute a point source. Nor are the trucks bringing the solid wastes to the landfill, since they "discharge" to the landfill and not to waters of the United States. CWA §502(12). However, the concrete tunnel from which the state took its water samples is clearly a point source from which, the sampling implicitly acknowledges, pollutants "may" be discharged, and since the tailings pile was deeded to the St. Francis County Environmental Corporation, that corporation, as owner of the point source, is a proper recipient of the §308 directive.

It should be emphasized, however, that MDNR, particularly its Solid Waste Division, is not anxious to see a threat develop to an approved landfill, given the difficulty of siting landfills generally. Care should be taken to secure as much support as is possible from the state, and, at a minimum, to keep them fully informed of our concerns and possible activities.

AMENDED RECOMMENDATION

In addition to the early preparation of a litigation report, as recommended in the November 17, 1980, memorandum, it is recommended

1) that an effort be made, at the level of the Regional Administrator, if necessary, to determine the present status of the state's negotiations with St. Joe Minerals, since a settlement by the state will be of important practical significance to the success of any litigation.

2) that an immediate effort be made to resolve the questions involving the chemistry of the leachate/tailings interaction. If these questions are resolved in favor of the Kovak position, EPA should consider seeking to have monitoring wells established in the landfill area to verify and trace the mobilization of lead under the authority of CWA §308. Ultimately, it may be necessary to seek injunctive relief against the existence of the landfill, under the authority of RCRA §7003 and CWA §311 and §504, but information developed by the research and monitoring program may compel the state to take action obviating EPA's involvement.

ENFC-LEGL-WHward emm-1-15-81-x3171-Doc 0852A

Preliminary Report

LEAD CONTAMINATION IN FISH IN BIG RIVER

by

James M. Crumaker

U.S. DEPARTMENT OF CONSERVATION
Fish and Wildlife Research Center
1110 College Avenue
Columbia, Missouri
July 18, 1980

(311) 449-3161

NOT FOR PUBLICATION

This progress report contains preliminary findings which may be subject to modification (on quality, no information from this report may be quoted or published without permission from the author)

A 11-11-80

MEMORANDUM

Date July 18 1980

The initial collection and analysis of fish from Big River for the lead contamination study have been completed. Ten fish each of 3 species (longear sunfish, black redbreast, and smallmouth bass) have been collected from 5 locations on Big River. Samples from these fish have been analyzed for lead. Station 1, the control, was at Highway U near Irondale (19 miles above the ruptured tailings pond) in Washington County. Station 2 was located 3 miles below the tailings pond at the Highway 67 south bridge. Station 3 was located 15 miles below the tailings pond at the Highway 67 north bridge. Station 4 was 25 miles below the tailings pond at Cole's Landing. Stations 2, 3 and 4 were in St. Francois County. Station 5 was located 37 miles below the tailings pond near Washington State Park in Washington County.

The edible portion (scaled fillet) of black redbreast and longear sunfish collected at the 4 site below the ruptured lead mine tailings pond contained much higher concentrations of lead than the edible portion of the fish collected at the control site. The edible portion of some of the smallmouth bass collected below the ruptured tailings pond also had higher concentrations of lead than the edible portion of the smallmouth bass collected at the control (Table 1). The concentration of lead in the edible portion of other species of fish collected incidentally with the above mentioned species followed the same pattern, that is, higher concentrations below the ruptured tailings pond (Table 2). The data on lead concentrations in the edible portion of fish reported by J. M. Cernicki in memoranda dated April 16 and June 13, 1980 have been included in Tables 1 and 2.

The maximum safe level of lead in the diet recommended for adults by the World Health Organization is 0.3 ppm (300 µg/g or 450 µg/day). The typical U.S. dietary intake of lead is 300 µg/day. An absorption of 150 µg/day lead into the blood, which corresponds to a dietary intake of approximately 2,000 µg/day, is the level of acute toxicity reported by Settle and Patten (1980).

The mean concentration of lead in the edible portion of longear sunfish and black redbreast was highest immediately below the break and decreased with a downstream progression (Figure 1). There was no relationship between the distance below the break and the mean concentration of lead in smallmouth bass.

Conclusions

The elevated concentrations of lead in the edible portion of fish in Big River may present a health hazard, however it may not be anymore hazardous than

James R. Whitley

-2-

July 18 1980

eating some commercially canned food (Table 3). Settle and Pitterson (1980) reported that tuna packed in lead soldered can contained 1.4 ppm lead. Other reports show an average of 0.7 ppm lead in tuna packed in lead soldered cans (Zook et al. 1976) and 0.5 ppm lead in other foods in lead soldered cans (Holby et al. 1974 and Mitchell and Aldous 1974).

Recommendations

We should request an opinion from the Missouri Division of Health and from the U.S. Food and Drug Administration regarding the hazards of lead in fish from Big River. Additional fish samples should be collected downstream from Washington State but to more accurately determine how far below the break contaminated fish occur.

Literature Cited

- Holby, A. Jr., J. Whitley, J. Fiorino, P. Corneliusen, and C. Jelinet. 1974. Environmental Health Perspective No. 7, R. Coyle and H. Falk, eds. Department of Health, Education and Welfare, Washington, D.C.
- Mitchell, D. G. and K. M. Aldous. 1974. Environmental Health Perspective No. 7. R. Coyle and H. Falk, eds. Department of Health, Education and Welfare, Washington, D.C.
- Settle, D. M. and C. Pitterson. 1980. Lead in Albicore. Guide to Lead Pollution in America. Science 207:1167-1176.
- Zook, E. J., P. H. L. Hackley, J. Emerson, J. Brooker, and G. Knobl, Jr. 1976. Journal of Agricultural Food Chemistry 24(47).

JRW:11

Attachment

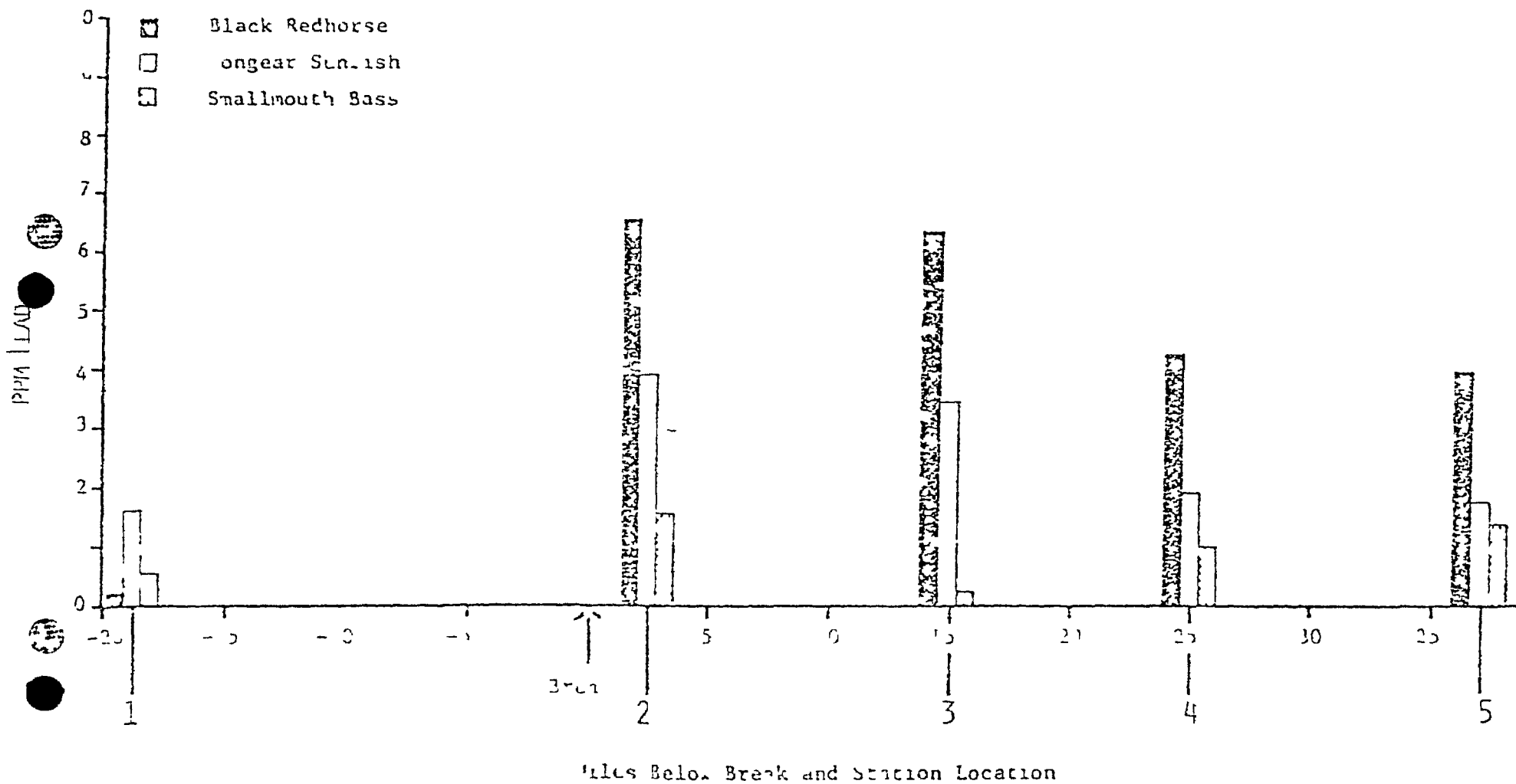


Figure 1 Mean concentration of lead in the edible portion of black redhorse, longear sunfish and smallmouth bass collected in Big River 1979 and 1980

THE DIVISION OF HEALTH
OF MISSOURI

INTER-OFFICE COMMUNICATION

TO Joseph B. Kirschert
Interim Director
Missouri Division of Health

FROM H. Denny Donnell, Jr., M.D., M.P.H. *HDD*
Director
Section of Disease Prevention

SUBJECT Lead in the Fish From the Big River

DATE August 29, 1980

I have reviewed the preliminary report entitled "Lead Contamination in Fish in Big River" by James B. Czarnetzki, which was sent to the Division of Health for review on July 28 by Larry R. Gale, Director, Missouri Department of Conservation.

It is my opinion that the ingestion of the sucker group of fish including the catfish species from the area of the Big River below the spill site would constitute a human health hazard. I would recommend that we advise the Missouri Department of Conservation to use whatever means are at their disposal to discourage the taking of such fish for human consumption and that we cooperate with them to provide health education to the people to clarify for them the nature of the hazard.

The spill occurred in 1977 and the spill is to my understanding uncorrected to the present time. The river had been seriously contaminated with lead in the past but after cessation of mining activities in the area it had gradually improved. The present study found significant elevations of lead in several species below the spill compared with above the spill and the levels remained relatively high for many miles below the spill. The levels in fish were much higher in the fish of the sucker type which are bottom feeders. As little as a one-half pound portion of fillet containing 0.7 parts per million would contribute 159 micrograms of lead to the diet. If this amount were added to the typical U.S. dietary intake of lead of 300 micrograms per day, it would exceed the World Health Organization recommended safe level in adults of 450 micrograms per day. This exceeds the recommended safe level but it does not reach the toxic level, which is reported to be 2,000 micrograms per day. We are, however, dealing with a situation in which we may be looking at a minimum estimate of exposure. In the first place, it is generally accepted that children have a lower tolerance to lead than adults. Lead is concentrated in bone to a much higher degree than in muscle tissue and it is my understanding that the common method of eating the catfish species is to cut off the head, remove the entrails, score the body to break up the bones and then cook and eat the entire carcass. It is my understanding that a one-half pound portion would be considered a very small portion per person attending a typical Big River fish fry and that two pounds of fish would not be an unusual amount for one person to consume. Removing scales, skin and bones would reduce the lead consumption.

Atch. 1

It occurs to me that the total amount of lead consumed by some individuals living close to the river and taking a fair number of fish from this river as a part of their regular diet could be a very high amount and I would propose that our health education effort be designed to alert these kinds of people to the possible toxicity they may have been subjected to over the past couple of years since the spill occurred

The Big River runs through Districts 3 4 & 7 from its origin in Iron County to its end at the Meramec River in Jefferson County. This particular spill from the tailings pond occurred very close to Desloge. I will be inspecting this area with Dr. Arthur Liang, Dr. James Whitley and others from Fish and Wildlife Research Center on Friday, August 29. I would like to evaluate first hand the circumstances of this source of lead contamination in relation to other potential lead tailings above ground in the old lead belt area and I will be considering the possibility of doing a study of lead levels in human beings in the area to see if we can confirm the impact of eating these fish.

HDD dr

Enclosure

THE IMPLICATION OF FINDING LEAD IN FISH
IN THE BIG RIVER OF MISSOURI

H. Denny Donnell, Jr. M.D., M.P.H.

The average U.S. diet contains from 200 to 300 micrograms of lead per day⁽¹⁾. Recent studies in Sweden showed their average diet to contain only 30 micrograms per day⁽²⁾. It has also recently been estimated that the diet of ancient man contained only 0.21 micrograms per day⁽³⁾.

The Missouri Department of Conservation study of sucker type fish from Big River found lead averages of 0.4 to 0.7 ppm in "edible fillets" with a few individual fish exceeding 1.0 ppm and 1.26 ppm being the highest recorded level⁽⁴⁾.

Eating one pound of fish containing 1 ppm would contribute 454 micrograms to the diet. Since each 100 micrograms of lead ingested by an adult raises the blood level by 11 microgram/100 ml (range 4.4 to 13.3)⁽⁵⁾, consuming one pound of such fish would increase the blood level by 50 micrograms/100 ml. The normal adult blood level ranges from 10 micrograms/100 ml to 40 micrograms/100 ml⁽⁶⁾.

Toxic effects of lead⁽⁷⁾ on cellular enzymes can be detected at levels of 2 micrograms/100 ml. Interference with heme synthesis occurs above the range of 15 to 30 microgram/100 ml and leads to anemia at higher levels. Reproductive system effects including chromosome damage, toxicity to fetus and reduced fertility of both men and women occur in the range of 20 to 40 micrograms/100 ml. Impaired kidney function and peripheral neuropathy occur in the range of 50 to 60 micrograms/100 ml. Encephalopathy occurs above the level of 100 to 120 micrograms/100 ml.

Children apparently absorb lead more readily from the alimentary tract and tend to develop symptoms at lower blood levels of lead.

There is considerable controversy concerning the so called 'normal levels' of lead in food and in man and there is no universally accepted "safe" level or toxic level for adults. The FDA requires that evaporated milk contain less

than 0.3 ppm and the industry average was recently reported to be 0.1 ppm⁽⁸⁾
The World Health Organization suggested safe limit for foods to be consumed by
adults is 0.3 ppm which would be a daily intake of 450 micrograms⁽³⁾

In light of this literature review it would seem prudent to discourage
the consumption of sucker type fish from that stretch of the Big River shown to
have these higher levels of lead in fish fillets

REFERENCES

- (1) National Academy of Sciences, Lead in the Human Environment, NAS, Washington, E C , 1980 p 107
- (2) NAS, 1980 p 108
- (3) Settle, D M and Patterson, C C , Lead in Albacore Guide to Lead Pollution in Americans, Science 207, March 14, 1980 p 1167-1176
- (4) Czarnecki, James M Lead Contamination in Fish in Big River, Missouri Department of Conservation Preliminary Report, July 18, 1980
- (5) NAS, 1980 p 115
- (6) NAS, 1980 p 135
- (7) NAS, 1980 p 74, 122-137
- (8) Crowell, Robert H Lead in Foods Quarterly Bulletin of the Association of Food and Drug Officials 44, July 1980 p 168-174

JEFFERSON CITY -- The Department of Conservation and the Division of Health today said people should be discouraged from eating suckers from the Big River in Missouri's lead mining belt. The warning comes after a study conducted by Department of Conservation biologists revealed higher-than-normal concentrations of lead in the black redhorse, a member of the sucker family.

"We feel we have an obligation to make people aware of this situation," says Department Chief of Fisheries Jim Fry. "We shared our data with the Division of Health, and they confirm that these lead levels are above normal and may cause health problems, particularly if large quantities of suckers are consumed." Other kinds of fishes tested also had elevated levels of lead, but they did not contain as much as the suckers.

Fry adds that lead concentrations in suckers tested from the Big River from Leadwood downstream to Mammoth Access, a distance of about 50 miles, averaged 0.5 parts per million. The amount in individual fishes ranged from 0.2 to 1.3 parts per million. The World Health Organization has set 0.3 parts per million of lead as a maximum safe level in food for adults. Since lead tends to concentrate in the bones, skin and scales, the amount of lead in a serving of fish can be reduced by removing these parts and eating only the flesh.

The Department of Conservation and the Division of Health plan to continue to monitor the situation.

Question Is superfund-financed remedial action legally appropriate for the St Joe Minerals lead tailings problem in light of recent amendments to RCRA suspending such materials from regulation under Subtitle C of the Act?

Answer Yes The tailings released by a catastrophic breach of the berm around the pile have resulted (based on studies by the Missouri Department of Conservation) in elevated levels of lead in the flesh of fish in Big River The Missouri Department of Health has recommended that people not eat large quantities of these fish, particularly bottom feeders Tailings continue to bleed into the river from the pile If the President determines - under Section 104 of the Superfund Act ("Comprehensive Environmental Response, Compensation, and Liability Act of 1980"), that the tailings, if they are deemed a "hazardous substance" under Section 101(14) of the Act, "present an imminent or substantial danger to the public health or welfare," he may act to have them removed from the river and to have further discharges from the pile abated

The legal question raised by the State, then, is "Are the tailings a 'hazardous substance' under Section 101(14) of the Act?" The answer is "Yes," for the following reason:

"Hazardous Substance" means (A) any substance designated pursuant to section 311(b)(2)(A) of the Federal Water Pollution Control Act, [and] (C) any hazardous waste having the characteristics identified under or listed pursuant to section 3001 of the Solid Waste Disposal Act [RCRA] (but not including any waste the regulation of which under the Solid Waste Disposal Act has been suspended by Act of Congress) "

Superfund Act, Section 101(14)

The lead in the tailings is in the form of lead sulfide, a hazardous substance under the Federal Water Pollution Control Act (Clean Water Act) Section 311(b)(2)(A), see 40 CFR Section 117.3, 44 FR 50777 So the tailings are a Superfund hazardous substance, by virtue of Superfund Act, Section 101(14)(A)

It is true that regulation of

"Solid waste from the extraction, beneficiation, and processing of ores and minerals, including phosphate rocks and overburden from the mining of uranium ore "

is suspended by recent Congressional action (see Congressional Record, October 1, 1980, H10175), and that the tailings - which are otherwise hazardous wastes under RCRA (see 40 CFR Section 261.31, 45 FR 33123) - are not Superfund hazardous substances by virtue of Superfund Act, Section 101 (14)(c), but the definition sets out alternative categories of hazardous substances

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